



219482.SEQUENCE Apr 2004.ST25
SEQUENCE LISTING

<110> Nelson, Edward L.
Nelson, Peter J.

<120> A VECTOR FOR POLYNUCLEOTIDE VACCINES

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<140> 09/242,202

<141> 1999-11-01

<150> PCT/US97/14306

<151> 1997-08-14

<150> 60/023,931

<151> 1996-08-14

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 35 40 45

Ser Asp Val Phe Asp Gly Asp Leu Gly Met Gly Ala Ala Lys Gly Leu
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Ser Leu Pro Thr His Asp Pro Ser Pro Leu Gln Arg Tyr Ser Glu Asp
 65 70 75 80

Pro Thr Val Pro Leu Pro Ser Glu Thr Asp Gly Tyr Val Ala Pro Leu
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Thr Cys Ser Pro Gln Pro Glu Tyr Val Asn Gln Pro Asp Val Arg Pro
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Pro Pro Ser Pro Arg Glu Gly Pro Leu Pro Ala Ala Arg Pro Ala Gly
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Ala Thr Leu Glu Arg Pro Lys Thr Leu Ser Pro Gly Lys Asn Gly Val
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Val Lys Asp Val Phe Ala Phe Gly Gly Ala Val Glu Asn Pro Glu Tyr
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Leu Thr Pro Gln Gly Thr Cys Ser Pro Gln Pro Glu Tyr Val Asn Gln
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Pro Asp Val Arg Pro Gln Pro Pro Ser Pro Arg Glu Gly Pro Leu Pro
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Ala Ala Arg Pro Ala Gly Ala Thr Leu Glu Arg Pro Lys Leu Ser Pro
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Gly Lys Asn Gly Val Val Lys Asp Val Phe Ala Phe Gly Gly Ala Val
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Glu Asn Pro Glu Tyr Leu Thr Pro Gln Gly Gly Ala Ala Pro Gln Pro
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| ccggagagct cccaacgcgt tggatgcatg gatgagggaa aggaggtag atctgtaatg | 1860 |
| aataagcagg aactttgaag actcagtgcac tcagtgcagta ataaagactc agtgacttct | 1920 |
| gatcctgtcc taactgccac tccttgttgt cccaagaaag cggcttcctg ctctctgagg | 1980 |
| aggacccctt ccctggaagg taaaactaag gatgtcagca gagaaatttt tccaccattg | 2040 |
| gtgcttggtc aaagaggaaa ctgatgagct cactctagat gagagagcag tgagggagag | 2100 |
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Glu Arg Ile Pro Leu Glu Asn Leu Gln Ile Ile Arg Gly Asn Met Tyr
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Tyr Glu Asn Ser Tyr Ala Leu Ala Val Leu Ser Asn Tyr Asp Ala Asn
 Page 17

115

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Phe Arg Glu Leu Ile Ile Glu Phe Ser Lys Met Ala Arg Asp Pro Gln
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1100 1105 1110

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Page 21

1115

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Gln Arg Leu Arg Ile Val Arg Gly Thr Gln Leu Phe Glu Asp Asn Tyr
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Ala Leu Ala Val Leu Asp Asn Gly Asp Pro Leu Asn Asn Thr Thr Pro
Page 22

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Arg Leu Leu Gln Glu Thr Glu Leu Val Glu Pro Leu Thr Pro Ser Gly
690 695 700

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Arg Lys Val Lys Val Leu Gly Ser Gly Ala Phe Gly Thr Val Tyr Lys
725 730 735

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820 825 830

Met Ser Tyr Leu Glu Asp Val Arg Leu Val His Arg Asp Leu Ala Ala
835 840 845

Arg Asn Val Leu Val Lys Ser Pro Asn His Val Lys Ile Thr Asp Phe
850 855 860

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865 870 875 880

Gly Gly Lys Val Pro Ile Lys Trp Met Ala Leu Glu Ser Ile Leu Arg
885 890 895

Arg Arg Phe Thr His Gln Ser Asp Val Trp Ser Tyr Gly Val Thr Val
900 905 910

Trp Glu Leu Met Thr Phe Gly Ala Lys Pro Tyr Asp Gly Ile Pro Ala
915 920 925

Arg Glu Ile Pro Asp Leu Leu Glu Lys Gly Glu Arg Leu Pro Gln Pro
930 935 940

Pro Ile Cys Thr Ile Asp Val Tyr Met Ile Met Val Lys Cys Trp Met
945 950 955 960

Ile Asp Ser Glu Cys Arg Pro Arg Phe Arg Glu Leu Val Ser Glu Phe
965 970 975

Ser Arg Met Ala Arg Asp Pro Gln Arg Phe Val Val Ile Gln Asn Glu
980 985 990

Asp Leu Gly Pro Ala Ser Pro Leu Asp Ser Thr Phe Tyr Arg Ser Leu
995 1000 1005

Leu Glu Asp Asp Asp Met Gly Asp Leu Val Asp Ala Glu Glu Tyr
1010 1015 1020

Leu Val Pro Gln Gln Gly Phe Phe Cys Pro Asp Pro Ala Pro Gly
1025 1030 1035

Ala Gly Gly Met Val His His Arg His Arg Ser Ser Ser Thr Arg
1040 1045 1050

Ser Gly Gly Gly Asp Leu Thr Leu Gly Leu Glu Pro Ser Glu Glu
1055 1060 1065

Glu Ala Pro Arg Ser Pro Leu Ala Pro Ser Glu Gly Ala Gly Ser
1070 1075 1080

Asp Val Phe Asp Gly Asp Leu Gly Met Gly Ala Ala Lys Gly Leu
1085 1090 1095

Gln Ser Leu Pro Thr His Asp Pro Ser Pro Leu Gln Arg Tyr Ser
1100 1105 1110

Glu Asp Pro Thr Val Pro Leu Pro Ser Glu Thr Asp Gly Tyr Val
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1115

Ala Pro Leu Thr Cys Ser Pro Gln Pro Glu Tyr Val Asn Gln Pro
1130 1135 1140

Asp Val Arg Pro Gln Pro Pro Ser Pro Arg Glu Gly Pro Leu Pro
1145 1150 1155

Ala Ala Arg Pro Ala Gly Ala Thr Leu Glu Arg Ala Lys Thr Leu
1160 1165 1170

Ser Pro Gly Lys Asn Gly Val Val Lys Asp Val Phe Ala Phe Gly
1175 1180 1185

Gly Ala Val Glu Asn Pro Glu Tyr Leu Thr Pro Gln Gly Gly Ala
1190 1195 1200

Ala Pro Gln Pro His Pro Pro Pro Ala Phe Ser Pro Ala Phe Asp
1205 1210 1215

Asn Leu Tyr Tyr Trp Asp Gln Asp Pro Pro Glu Arg Gly Ala Pro
1220 1225 1230

Pro Ser Thr Phe Lys Gly Thr Pro Thr Ala Glu Asn Pro Glu Tyr
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Leu Gly Leu Asp Val Pro Val
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<211> 1260
<212> PRT
<213> Rattus norvegicus

<400> 37

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1 5 10 15

Ala Leu Leu Pro Pro Gly Ile Ala Gly Thr Gln Val Cys Thr Gly Thr
20 25 30

Asp Met Lys Leu Arg Leu Pro Ala Ser Pro Glu Thr His Leu Asp Met
35 40 45

Leu Arg His Leu Tyr Gln Gly Cys Gln Val Val Gln Gly Asn Leu Glu
50 55 60

Leu Thr Tyr Val Pro Ala Asn Ala Ser Leu Ser Phe Leu Gln Asp Ile
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| | | | | | | | | | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 65 | | 70 | | 75 | | 80 | | | | | | | | | |
| Gln | Glu | Val | Gln | Gly | Tyr | Met | Leu | Ile | Ala | His | Asn | Gln | Val | Lys | Arg |
| | | | | 85 | | | | | 90 | | | | | 95 | |
| Val | Pro | Leu | Gln | Arg | Leu | Arg | Ile | Val | Arg | Gly | Thr | Gln | Leu | Phe | Glu |
| | | | 100 | | | | | 105 | | | | | 110 | | |
| Asp | Lys | Tyr | Ala | Leu | Ala | Val | Leu | Asp | Asn | Arg | Asp | Pro | Gln | Asp | Asn |
| | | 115 | | | | | 120 | | | | | 125 | | | |
| Val | Ala | Ala | Ser | Thr | Pro | Gly | Arg | Thr | Pro | Glu | Gly | Leu | Arg | Glu | Leu |
| | 130 | | | | | 135 | | | | | 140 | | | | |
| Gln | Leu | Arg | Ser | Leu | Thr | Glu | Ile | Leu | Lys | Gly | Gly | Val | Leu | Ile | Arg |
| 145 | | | | | 150 | | | | | 155 | | | | | 160 |
| Gly | Asn | Pro | Gln | Leu | Cys | Tyr | Gln | Asp | Met | Val | Leu | Trp | Lys | Asp | Val |
| | | | | 165 | | | | | 170 | | | | | 175 | |
| Phe | Arg | Lys | Asn | Asn | Gln | Leu | Ala | Pro | Val | Asp | Ile | Asp | Thr | Asn | Arg |
| | | | 180 | | | | | 185 | | | | | 190 | | |
| Ser | Arg | Ala | Cys | Pro | Pro | Cys | Ala | Pro | Ala | Cys | Lys | Asp | Asn | His | Cys |
| | | 195 | | | | | 200 | | | | | 205 | | | |
| Trp | Gly | Glu | Ser | Pro | Glu | Asp | Cys | Gln | Ile | Leu | Thr | Gly | Thr | Ile | Cys |
| | 210 | | | | | 215 | | | | | 220 | | | | |
| Thr | Ser | Gly | Cys | Ala | Arg | Cys | Lys | Gly | Arg | Leu | Pro | Thr | Asp | Cys | Cys |
| 225 | | | | | 230 | | | | | 235 | | | | | 240 |
| His | Glu | Gln | Cys | Ala | Ala | Gly | Cys | Thr | Gly | Pro | Lys | His | Ser | Asp | Cys |
| | | | | 245 | | | | | 250 | | | | | 255 | |
| Leu | Ala | Cys | Leu | His | Phe | Asn | His | Ser | Gly | Ile | Cys | Glu | Leu | His | Cys |
| | | | 260 | | | | | 265 | | | | | 270 | | |
| Pro | Ala | Leu | Val | Thr | Tyr | Asn | Thr | Asp | Thr | Phe | Glu | Ser | Met | His | Asn |
| | | 275 | | | | | 280 | | | | | 285 | | | |
| Pro | Glu | Gly | Arg | Tyr | Thr | Phe | Gly | Ala | Ser | Cys | Val | Thr | Thr | Cys | Pro |
| | 290 | | | | | 295 | | | | | 300 | | | | |
| Tyr | Asn | Tyr | Leu | Ser | Thr | Glu | Val | Gly | Ser | Cys | Thr | Leu | Val | Cys | Pro |
| 305 | | | | | 310 | | | | | 315 | | | | | 320 |

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Pro Asn Asn Gln Glu Val Thr Ala Glu Asp Gly Thr Gln Arg Cys Glu
325 330 335

Lys Cys Ser Lys Pro Cys Ala Arg Val Cys Tyr Gly Leu Gly Met Glu
340 345 350

His Leu Arg Gly Ala Arg Ala Ile Thr Ser Asp Asn Val Gln Glu Phe
355 360 365

Asp Gly Cys Lys Lys Ile Phe Gly Ser Leu Ala Phe Leu Pro Glu Ser
370 375 380

Phe Asp Gly Asp Pro Ser Ser Gly Ile Ala Pro Leu Arg Pro Glu Gln
385 390 395 400

Leu Gln Val Phe Glu Thr Leu Glu Glu Ile Thr Gly Tyr Leu Tyr Ile
405 410 415

Ser Ala Trp Pro Asp Ser Leu Arg Asp Leu Ser Val Phe Gln Asn Leu
420 425 430

Arg Ile Ile Arg Gly Arg Ile Leu His Asp Gly Ala Tyr Ser Leu Thr
435 440 445

Leu Gln Gly Leu Gly Ile His Ser Leu Gly Leu Arg Ser Leu Arg Glu
450 455 460

Leu Gly Ser Gly Leu Ala Leu Ile His Arg Asn Ala His Leu Cys Phe
465 470 475 480

Val His Thr Val Pro Trp Asp Gln Leu Phe Arg Asn Pro His Gln Ala
485 490 495

Leu Leu His Ser Gly Asn Arg Pro Glu Glu Asp Leu Cys Val Ser Ser
500 505 510

Gly Leu Val Cys Asn Ser Leu Cys Ala His Gly His Cys Trp Gly Pro
515 520 525

Gly Pro Thr Gln Cys Val Asn Cys Ser His Phe Leu Arg Gly Gln Glu
530 535 540

Cys Val Glu Glu Cys Arg Val Trp Lys Gly Leu Pro Arg Glu Tyr Val
545 550 555 560

Ser Asp Lys Arg Cys Leu Pro Cys His Pro Glu Cys Gln Pro Gln Asn
565 570 575

Ser Ser Glu Thr Cys Phe Gly Ser Glu Ala Asp Gln Cys Ala Ala Cys
580 585 590

Ala His Tyr Lys Asp Ser Ser Ser Cys Val Ala Arg Cys Pro Ser Gly
595 600 605

Val Lys Pro Asp Leu Ser Tyr Met Pro Ile Trp Lys Tyr Pro Asp Glu
610 615 620

Glu Gly Ile Cys Gln Pro Cys Pro Ile Asn Cys Thr His Ser Cys Val
625 630 635 640

Asp Leu Asp Glu Arg Gly Cys Pro Ala Glu Gln Arg Ala Ser Pro Val
645 650 655

Thr Phe Ile Ile Ala Thr Val Glu Gly Val Leu Leu Phe Leu Ile Leu
660 665 670

Val Val Val Val Gly Ile Leu Ile Lys Arg Arg Arg Gln Lys Ile Arg
675 680 685

Lys Tyr Thr Met Arg Arg Leu Leu Gln Glu Thr Glu Leu Val Glu Pro
690 695 700

Leu Thr Pro Ser Gly Ala Met Pro Asn Gln Ala Gln Met Arg Ile Leu
705 710 715 720

Lys Glu Thr Glu Leu Arg Lys Val Lys Val Leu Gly Ser Gly Ala Phe
725 730 735

Gly Thr Val Tyr Lys Gly Ile Trp Ile Pro Asp Gly Glu Asn Val Lys
740 745 750

Ile Pro Val Ala Ile Lys Val Leu Arg Glu Asn Thr Ser Pro Lys Ala
755 760 765

Asn Lys Glu Ile Leu Asp Glu Ala Tyr Val Met Ala Gly Val Gly Ser
770 775 780

Pro Tyr Val Ser Arg Leu Leu Gly Ile Cys Leu Thr Ser Thr Val Gln
785 790 795 800

Leu Val Thr Gln Leu Met Pro Tyr Gly Cys Leu Leu Asp His Val Arg
805 810 815

Glu His Arg Gly Arg Leu Gly Ser Gln Asp Leu Leu Asn Trp Cys Val
820 825 830

Gln Ile Ala Lys Gly Met Ser Tyr Leu Glu Asp Val Arg Leu Val His
 835 840 845
 Arg Asp Leu Ala Ala Arg Asn Val Leu Val Lys Ser Pro Asn His Val
 850 855 860
 Lys Ile Thr Asp Phe Gly Leu Ala Arg Leu Leu Asp Ile Asp Glu Thr
 865 870 875 880
 Glu Tyr His Ala Asp Gly Gly Lys Val Pro Ile Lys Trp Met Ala Leu
 885 890 895
 Glu Ser Ile Leu Arg Arg Arg Phe Thr His Gln Ser Asp Val Trp Ser
 900 905 910
 Tyr Gly Val Thr Val Trp Glu Leu Met Thr Phe Gly Ala Lys Pro Tyr
 915 920 925
 Asp Gly Ile Pro Ala Arg Glu Ile Pro Asp Leu Leu Glu Lys Gly Glu
 930 935 940
 Arg Leu Pro Gln Pro Pro Ile Cys Thr Ile Asp Val Tyr Met Ile Met
 945 950 955 960
 Val Lys Cys Trp Met Ile Asp Ser Glu Cys Arg Pro Arg Phe Arg Glu
 965 970 975
 Leu Val Ser Glu Phe Ser Arg Met Ala Arg Asp Pro Gln Arg Phe Val
 980 985 990
 Val Ile Gln Asn Glu Asp Leu Gly Pro Ser Ser Pro Met Asp Ser Thr
 995 1000 1005
 Phe Tyr Arg Ser Leu Leu Glu Asp Asp Asp Met Gly Asp Leu Val
 1010 1015 1020
 Asp Ala Glu Glu Tyr Leu Val Pro Gln Gln Gly Phe Phe Ser Pro
 1025 1030 1035
 Asp Pro Thr Pro Gly Thr Gly Ser Thr Ala His Arg Arg His Arg
 1040 1045 1050
 Ser Ser Ser Thr Arg Ser Gly Gly Gly Glu Leu Thr Leu Gly Leu
 1055 1060 1065
 Glu Pro Ser Glu Glu Gly Pro Pro Arg Ser Pro Leu Ala Pro Ser
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1070

1075

1080

| | | | | | | | | | | | | | | |
|-----|------|-----|-----|-----|-----|------|-----|-----|-----|-----|------|-----|-----|-----|
| Glu | Gly | Ala | Gly | Ser | Asp | Val | Phe | Asp | Gly | Asp | Leu | Ala | Met | Gly |
| | 1085 | | | | | 1090 | | | | | 1095 | | | |
| Val | Thr | Lys | Gly | Leu | Gln | Ser | Leu | Ser | Pro | His | Asp | Leu | Ser | Pro |
| | 1100 | | | | | 1105 | | | | | 1110 | | | |
| Leu | Gln | Arg | Tyr | Ser | Glu | Asp | Pro | Thr | Leu | Pro | Leu | Pro | Pro | Glu |
| | 1115 | | | | | 1120 | | | | | 1125 | | | |
| Thr | Asp | Gly | Tyr | Val | Ala | Pro | Leu | Ala | Cys | Ser | Pro | Gln | Pro | Glu |
| | 1130 | | | | | 1135 | | | | | 1140 | | | |
| Tyr | Val | Asn | Gln | Ser | Glu | Val | Gln | Pro | Gln | Pro | Pro | Leu | Thr | Pro |
| | 1145 | | | | | 1150 | | | | | 1155 | | | |
| Glu | Gly | Pro | Leu | Pro | Pro | Val | Arg | Pro | Ala | Gly | Ala | Thr | Leu | Glu |
| | 1160 | | | | | 1165 | | | | | 1170 | | | |
| Arg | Pro | Lys | Thr | Leu | Ser | Pro | Gly | Lys | Asn | Gly | Val | Val | Lys | Asp |
| | 1175 | | | | | 1180 | | | | | 1185 | | | |
| Val | Phe | Ala | Phe | Gly | Gly | Ala | Val | Glu | Asn | Pro | Glu | Tyr | Leu | Val |
| | 1190 | | | | | 1195 | | | | | 1200 | | | |
| Pro | Arg | Glu | Gly | Thr | Ala | Ser | Pro | Pro | His | Pro | Ser | Pro | Ala | Phe |
| | 1205 | | | | | 1210 | | | | | 1215 | | | |
| Ser | Pro | Ala | Phe | Asp | Asn | Leu | Tyr | Tyr | Trp | Asp | Gln | Asn | Ser | Ser |
| | 1220 | | | | | 1225 | | | | | 1230 | | | |
| Glu | Gln | Gly | Pro | Pro | Pro | Ser | Asn | Phe | Glu | Gly | Thr | Pro | Thr | Ala |
| | 1235 | | | | | 1240 | | | | | 1245 | | | |
| Glu | Asn | Pro | Glu | Tyr | Leu | Gly | Leu | Asp | Val | Pro | Val | | | |
| | 1250 | | | | | 1255 | | | | | 1260 | | | |